

CO-ORDINATION OF EFFORT IN TSETSE-FLY INVESTIGATIONS

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BY

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I have been asked by the Administration of Northern Rhodesia, which I have the honour of representing at this Conference, to put before you the case for co-ordination of effort by the various African Colonies in Tsetse-fly investigation, principally in the experimental determination of the Game-fly relationship. It gives me considerable satisfaction to open a discussion on this subject, as I have long felt the necessity for co-operation of effort if any definite advance of knowledge is to be achieved. In fact, it will be within the recollection of certain here present that I pressed this point of view at the first Imperial Entomological Conference, five years ago, and at a subsequent meeting of the Royal Society of Tropical Medicine, when certain recommendations of the Glossina Sub-Committee of the Bureau of Entomology came up for review.

Now let me make it clear at once that nothing which I shall say to-day is in anyway directed against entomological research. As I said five years ago, I do not wish to place difficulties in its way, but I desire most sincerely to encourage it; and have the greatest admiration for the work which is being done by the various entomologists scattered throughout Tropical Africa, who, at considerable risk to themselves, are doing their utmost to advance knowledge. But I have long held, and I see no reason to change my views, that the problem is not a purely entomological question and that, in devising any plan of research, we must bear this in mind. The real problem is, of course, Trypanosomiasis of man and his domestic animals, and it comprises four factors: (1) the

pathogenic virus or trypanosomes; (2) the population and the domestic stock; (3) the transmitting agent or tsetse-fly, and (4) the reservoir of the virus or big game. In my judgment substantial advance in knowledge can only be achieved by research carefully devised and adequately co-ordinated with the object of taking into consideration, at the same time and in the same locality, all of the above factors. In short, I advocate centralization of effort.

What has been done in the way of research into the Trypanosomiasis problem since the Glossina Sub-Committee of the Imperial Bureau of Entomology published its report five years ago? Probably only those who, like myself, have to read and summarise the innumerable papers dealing directly and indirectly with this subject are in a position to realise the enormous amount of human energy which is being devoted to it. There are the entomological papers of Lloyd, Swynnerton, Carpenter, Fiske, Schwetz and others; the very able and suggestive epidemiological papers of Duke; the dozens of papers dealing with the action of various drugs on infected man and stock, not to mention equally numerous papers of a purely academic nature. These reports are scattered throughout a vast range of journals and periodicals. I can assure you the mere task of reading and summarising them for the *Tropical Diseases Bulletin* is no small undertaking. While the reviewer is filled with admiration for the energy and enthusiasm shown by these reports, he is only too conscious of the fact that the energy is often misdirected, that the reports, although often very long, frequently, owing to the omission of some essential information, do not permit of any inference, that even work admirably conceived and executed is often brought to nought by the fact that those who are conducting it go on leave without arrangements being made to carry it on. As an illustration of this one cannot do better than cite his own experience in attempting to summarise the position of knowledge regarding the therapeutic action of certain drugs in trypanosomiasis. Time and again one finds a record of most carefully conducted observations on long series of patients; then at periods varying from a few months to a year after the commencement of the work the observer goes on leave, or is placed on some other duty, and nothing more is heard of the patients. Now we can only judge of the result of treatment by ascertaining what has happened after the lapse of a

number of years, and as this information is in the vast majority of instances not forthcoming, the initial excellent work is thus rendered useless and knowledge or, shall I say, ignorance, remains *in statu quo*.

I had a letter the other day from Dr. Lloyd, who, as you know, has wide experience of tsetse work and is at present investigating the subject in Nigeria. He tells me that he has fenced round a small area with the object of making a game exclusion experiment. He writes :—

‘ The fence was less trouble to construct than I anticipated, and is strong enough to keep out small stuff, but would not stop a roan or buffalo. In construction, when it was about three-parts done, a herd of some thirty roan got in and were there when we went to work. The labourers started to chase them and did capture a small one, but the great beasts crashed and leaped through in twenty places and the noise frightened some pig at the pool and they drove the wire out pig-shape in a dozen spots. After it was closed it took some clearing, although the area is only a half square mile. Duiker were the worst trouble as they got into the thickets and would not be flushed. However, it is clear of antelope now. The results are promising to be of interest but I fear they will not be convincing. *Tachinoides* does not seem to be affected but *morsitans* has become very scarce compared to the control. As an anomaly the infection has gone up considerably. This shows that most of, if not all, the *morsitans* in the place are emigrants from the neighbouring belts of fly. The main point of interest is the very emaciated condition of the female flies.’

Well, gentlemen, I know Dr. Lloyd intimately, and was associated with him on the Luangwa Commission. He is an extremely able and conscientious worker and, if his foreboding should unfortunately turn out to be true and the results prove unconvincing, it will, I am satisfied, not be through any fault of his, but merely of the system under which he is working. As most of you know I have always been an ardent advocate of a large and carefully controlled experiment of game destruction in a localised area and believe that from it we should obtain information of the greatest possible value. Some of you will be relieved to hear that it is not my intention to enlarge upon this much-debated subject on the present occasion. I do not like to assume the rôle of a prophet, but I am afraid that we shall not learn much from Dr. Lloyd’s experiment. He is evidently too short of funds to carry it out efficiently and on a sufficiently large scale ; he is working almost single-handed and it is very doubtful to me whether, if unassisted, he will be able to make all the observations that such an experiment demands. Finally, in order to obtain information of real value from an experiment of this sort, not only

must it be preceded by a thorough and scientific investigation of the conditions, both in respect of fly and of the trypanosomiasis of man, stock and game, but it must be followed by an equally careful investigation extended over a sufficient length of time—probably running into a number of years—or no precise information regarding the results of game elimination can be expected. In due course Dr. Lloyd will, doubtless, go on leave and then, if we can be guided by what usually happens on such occasions, the work will either come to an end, or, which amounts to the same thing, someone who has other interests, or no interests at all, will take over.

In connection with this game exclusion experiment, you will perhaps pardon me if I refer to a passage in the extremely interesting Report of the East Africa Commission which I had the pleasure of reading a few weeks ago. The passage runs as follows:—

‘The question of game destruction is a very thorny one and has aroused much feeling. In this connection the opinion of Mr. Walter, now Lord, Rothschild, is worth recording: “To prove to the utilitarians the absolute uselessness of this proceeding, I should like to point out that the extermination of the game animals in any large area would be a task of several years’ duration and the following would take place. As, year by year, the large animals grew scarcer, the tsetse flies *Glossina palpalis* and *morsitans*, which are the means of spreading sleeping-sickness in man and nagana in animals, would be driven to bite monkeys, carnivora, rats, mice, and the numerous small animals of those regions; these would be infected and the trypanosomes of the disease would gaily survive. This would not only mean the continuance of the disease in its present degree, but would also cause a sharp increase of both diseases.”’

Now, sir, I must confess that personally I should have experienced some difficulty in finding anything less worth recording. In the first place, Lord Rothschild ventures to prejudge in the most categorical manner, and without the slightest evidence, what would happen as the result of an experiment—to my mind a most dangerous and unwarrantable procedure—and in the second place, even assuming his premise, for which of course we have similarly no support, namely, that tsetse flies in the absence of large animals would be forced to feed on monkeys, carnivora, rodents and mice, the inference that ‘these would be infected and the trypanosomes of the disease would gaily survive, and that this would not only mean the continuance of the disease in its present degree, but would also cause a sharp increase of both diseases,’ indicates complete

ignorance of what is known regarding the effect of the pathogenic trypanosomes of man and stock on these small animals.

I mention this because it illustrates in such an admirable manner my point that the Trypanosomiasis problem is not one which can be fully investigated by entomologists alone or, for that matter, by any other class of worker.

It is not my intention to refer in detail to the most valuable work which Dr. Duke is carrying out in Uganda on the protozoology and epidemiology of the disease. All who are familiar with his work realize its great value, but here again I feel that the work is suffering because Dr. Duke's other duties make great demands upon his time and because he lacks sufficient expert assistance and adequate financial resources to put to the crucial test the theories which he has built up at the cost of years of patient research. I am glad to learn that one of the recommendations of the International Conference on Sleeping Sickness which met in London last month under the auspices of the 'League of Nations' is that the International Commission, which it is suggested to form, should be placed under the presidency and control of Dr. Duke, and I am especially glad to see that they have coupled the recommendation with the suggestion that Dr. Duke's staff should be increased by the services of a bio-chemist and entomologist. Apart from this, I do not hope for much from the labour of the International Conference. Such a Conference seems to me to be premature. I cannot believe that its efforts are likely to advance knowledge and we hardly know enough at the present time to formulate regulations governing the International Frontiers in Tropical Africa. In my judgment, much more is to be hoped from an inter-Colonial Conference and from the co-ordinated and sustained effort which it would be in the power of such a Conference to ensure.

The case for co-ordination appears to me to be overwhelmingly strong, for the following reasons:—

Many investigators are at present working in more or less isolation at the different aspects—entomological, epidemiological, pathological, and therapeutic—of trypanosomiasis. The cost of this work is divided amongst many Colonies and therefore probably does not fall unduly heavily upon any one Colony, but in the aggregate the total annual expenditure must be very large. Unfortunately, as the

individual workers are isolated, insufficiently supplied with funds and assistance, and compelled to leave their work at more or less stated intervals, and sometimes at periods which are not stated, it is not surprising that much that is done is unsatisfactory and incomplete owing to want of organisation to ensure continuity, and consequently much time and money is wasted. Such a process has continued long enough; it is uneconomical and although the expense to each Colony may be relatively slight, in the aggregate it is large, and knowledge, if it advances at all, does so slowly and uncertainly.

Many of the problems which demand solution are very large, as, for example, the relationship of game to trypanosomiasis and the tsetse or the various problems which, five years ago, the Glossina Sub-Committee proposed should be investigated. Such problems cannot, with any hope of success, be investigated by isolated workers, whether entomologists or pathologists, but only by large and well-equipped Commissions having at command large funds.

I would therefore urge, as I did five years ago, (1) that in future, effort should be concentrated instead of dissipated; (2) that the work of the entomological and medical and veterinary research into the Trypanosomiasis problem be combined under one central organisation, and such organisation be supported by pooled contributions of all the African Colonies interested; (3) that the personnel of the investigating commission or commissions be large enough to ensure continuity of work in all directions, thus obviating interruptions due to such exigencies as illness or leave and preventing staleness and inertia, which is so likely to result from isolation; (4) that sufficient funds be placed at the disposal of the investigating commissions to allow of the employment of adequate native labour, so that experimental work can be undertaken on a sufficiently large scale, thus enabling the investigation of the relationship of fly and trypanosomiasis to game, and of the various problems enumerated in the Report of the Glossina Sub-Committee of the Imperial Bureau of Entomology, to be carried out in a satisfactory manner and with some reasonable prospect of success.

Whether such a scheme would cost more than is at present being spent individually by the different Colonies, I do not know. Certainly a large sum would be needed, and if this were not forthcoming the whole plan would collapse. Whether the problem is sufficiently

grave to warrant a large expenditure in a serious endeavour to find a solution, I will not attempt to discuss, as I am neither a politician nor a student of political economy, but judging from the valuable Report of the East Africa Commission to which I have already referred I gather that certain politicians and economists are abundantly satisfied of the gravity of the situation.